Is Barefoot Better? : A Review of the Research and Insight into the Experiences of Barefoot Runners

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Abstract

Running, arguably the first competitive sport invented, remains popular even today. In its long life running has experienced many changes, including footwear. Over the centuries common running footwear has evolved from barefoot, to thin sandals, to thick soled modern running shoes, and today many are beginning to transition back to barefoot. Although the modern running shoe was created to prevent injury, many question if shoes achieve their goal or if it would be safer to run barefoot. A review of the research reveals that there is not one individual factor that allows researchers to label one running method as safer than the other. Science is also not the only factor that has made runners want to go barefoot; the experience while running barefoot is likely the most influential factor. I will review the research and the culture that surround barefoot running to allow individuals to establish their thoughts on barefoot running.

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At the age of eleven I fell in love with running. Junior high was the beginning of school sports and like all of the other students I wanted to find my place among the athletes. In my search for who I was I stumbled upon running. My father ran when he was in high school and his continued love for the sport influenced me to give it a try. My first few runs were certainly difficult, but underneath the strain was something that made me want to keep going. A few weeks later I ran my first 5k race, although I was not fast, the minute I crossed the finish line I realized that I was hooked. During my race I allowed myself to not worry about how well my run was going and let myself become encompassed in the sheer pleasure of the way my body felt. In running I found myself and my own little piece of freedom. Ever since that first race I have used running as an opportunity to clear my mind and leave the rest of the world behind me. I often cannot wait to escape to the quiet, calming sounds of my breathing and my shoes against the pavement.

Many people do not understand the lure of running, and I am often asked why I love it so much. I usually struggle to provide an answer that properly explains the way running makes me feel. There is not a clear-cut, flawless reason why running is so enjoyable. Although running provides an opportunity to leave my worries behind me, I do not exactly forget all of my worries they just seem less scary. When I am running I feel like I am capable of anything, like I can simply leap over any obstacle that I meet. The freedom from worry is addicting and often fuels me to put my feet to the pavement.

In more recent years the idea of barefoot running has cropped up more and more in the media and throughout the world of running. Naturally, I became curious whether running would provide the same escape if I could no longer lose myself in the comforting sound of my shoes

against the road. Curiosity finally got the best of me and I decided it was time to try ditching the shoes and hit the road barefoot.

The exercise science major in me would not allow me to just jump out of my shoes and into barefoot running, but instead I jumped into research first. I began to bury myself in the personal experiences of practiced barefoot runners and a variety of research studies on the many different aspects of running barefoot. I wanted to be sure that I did my experiment safely and that barefoot running was not overtly harmful. Of course, I quickly learned that there is not a hard "yes" or "no" answer as to whether or not barefoot running is safer or more effective than shod running. However, I learned a lot about the science and culture behind barefoot running.

"Glee and determination are usually antagonistic emotions, yet the Tarahumara were brimming with both at once, as if running to death made them feel more alive" – Christopher McDougall, *Born to Run*

Many would label barefoot running as a fad that has become increasingly popular in the past few years, but those who run barefoot would likely beg to differ. A large push behind barefoot running is that it is the way that we are meant to run, that it is natural. Dr. Daniel Lieberman sums the feelings of many barefoot runners toward the thoughts of those who think barefoot running is merely a phenomenon; "if you think barefoot running is a fad, then it is a two-million year old fad" (Nearman, 2011, p. 5). People have run without shoes for ages and, when looking from an evolutionary standpoint, the foot should not require a shoe in order to run long distances. In fact, as we'll see, many argue that the shoe is often a preventing factor in allowing humans to reach their full running potential, both in performance and experience.

Although there is a large amount of research available, the science is not what causes most barefoot runners to begin their endeavor to "go natural." Barefoot Ken

Bob Saxton is one of these runners. He turned to barefoot running when he reached his breaking point with the blisters that constantly plagued him due to shoes. Escape from injury appears to be a common driving force behind the transition for many people. Jason Robillard, author of *The Barefoot Running Book: A Practical Guide to the Art and Science of Barefoot and Minimalist Shoe Running*, began running barefoot after a traumatic injury that doctors claimed would likely prevent him from ever running again. For individuals such as these, barefoot running provides an escape or a comeback opportunity from an injury, and this benefit is all that is initially required to give going barefoot an honest try.

Surprisingly even these physical benefits are not usually what barefoot runners claim is the most important benefit to their running choices. There is a much deeper draw to this art form; the emotions it often stirs within. While many associate running with fatigue and boredom, barefoot runners find it exciting and renewing. There are a multitude of reasons runners say that going barefoot makes all of the difference in their feelings about running, but in the end it all boils down to the fact that going barefoot brings a special joy to the run that shoes seemed to prevent.

The Tarahumara, a Native American tribe in northern Mexico, are some of the world's most famous, yet reclusive, barefoot runners. In the few times distance runners have had the opportunity to run alongside the Tarahumara it is not just their running abilities that stand out, but also the sheer joy that they run with; a joy that is often considered childlike (McDougall, 2009). These are individuals who have not lost the love for running that many fading runners claim has become lost for them. Whether these runners stumble upon it on their own or through research about the Tarahumara and other barefoot tribes or groups many runners have found that when they lose their shoes they gain a renewed love for running.

The question then arises why going barefoot can rekindle, or even create, a love for running. Author and barefoot runner, Jason Robillard, explains that "you have never really experienced running until you have gone barefoot and felt the ground beneath your feet" (Robillard, 2010, p. 69). But why would direct contact with the ground affect a running experience so much? According to Michael Sandler (2010), author of *Barefoot Running: How to Run Light and Free by Getting in Touch with the Earth,* people yearn to reconnect with the earth. The evidence comes from the fact that we put parks in the middle of our cities and nature is often a central part in our artwork. In fact, many people begin running in general to gain a connection to the earth, but this does not always seem to be enough. For many the physical contact with the ground that going barefoot provides makes the connection to the earth while running feel more complete and satisfying. For Barefoot Ken Bob Saxton, the experience of running barefoot is so satisfying he says he would continue to do it even if it were safer to wear shoes (Saxton & Wallack, 2011).

There are a large variety of reasons that runners claim direct contact with the earth brings people so much joy. According to Michael Sandler, the electromagnetic energy of the earth is the reason going barefoot makes people feel so good. The earth has a frequency of approximately 7.83 Hertz, which also happens to be the frequency that the brain utilizes to survive and function properly. The rubber of our shoes prevents the transfer of the electrical energy to our bodies. It is believed that contact with the electrical energy of the earth will not only set our minds at ease, but also helps reduce inflammation and other injuries. Pain reduction while running is also likely to add to the feeling of ease and joy that a runner experiences, especially because running is not usually thought of as a pain-free activity (Sandler, 2010).

According to Barefoot Ted McDonald, our shoes detach us from our feet and the earth

beneath them. He says that shedding our shoes will reconnect us to our feet and allow us to truly "feel the world and grow from interacting with it" (Robillard, 2010, p. 12). Tallis, a barefoot runner and the creator of a blog entitled *The Joy of Barefoot Running*, supports the thoughts of Barefoot Ted McDonald, claiming that his connection to the earth when running barefoot connected him to a deeper part of himself. He says, "I become one with myself, which in turn brings me to a state of oneness with everything" (Tallis, 2012). It is that special connection with the ground that opens the doorway for deeper connections with our own selves and the world.

The feeling of the ground beneath your feet is not the only reason barefoot runners claim going barefoot creates a connection to the world around us. Michael Sandler (2010) describes barefoot running as "running aware." He explains that to run barefoot you have to turn your mind off to the everyday matters of life and open it to your surroundings in order to run safely. Therefore running barefoot becomes therapeutic for many people because it provides a chance to escape daily worries and get in touch with our bodies and nature. Running barefoot forces a connection with the world in order to keep our feet safe. Often once this small connection is created it becomes almost impossible to keep ourselves closed off from the glory of the world we live in.

Michael Sandler is not the only runner who thinks barefoot running allows individuals to get out of themselves and into the world around them. Barefoot Ken Bob Saxton mentions that many runners try to force themselves to escape the fact that they are running, often by using iPods or cellphones as a distraction (Saxton & Wallack, 2011). However, when barefoot running, it is dangerous to disengage your mind and senses from the activity. Listening to your footsteps helps you monitor how forcefully you are striking the ground and being aware of your surroundings allows you to avoid injuries. Barefoot running forces you to leave the hiding place

in the back of your mind and immerse yourself in the moment and the world surrounding you. One barefoot runner shares that going barefoot allows you to give attention to something that is greater and more living than your own personal worries (Nixa, 2012).

In *Born to Run,* Christopher McDougall frequently marvels at the sheer joy that the Tarahumara and various ultra-runners seem to experience when they are running. His observations open our eyes to the idea that they enjoy the run so much because of their ability to embrace the experience and their surroundings. He describes the way that ultra-marathoner Scott Jurek, despite his success and competitiveness, is genuinely interested in the other runners. Scott does not focus all of his energy on himself, but instead focuses on the world and people that are around him. McDougall also describes the ball game of the Tarahumara. While watching, he quickly realizes that even the slowest players are not left behind and are fully involved during the game. The game is played back and forth along a pre-determined stretch of land so that each time the lead runners reach one end with the ball it is turned around and those that are slower become key players as the ball, and other runners, come flying back their way. It is as if the game is designed to allow all of the runners to escape from themselves and embrace the comradery of running together. Learning from these observations McDougall stated that "we don't race to beat each other, we race to be with each other" (McDougall, 2009, p. 253). Although these examples are not directly related to barefoot running they are perfect examples of the difference that can be made when a runner looks beyond themselves and to the moment that is occurring around them, which is something that going barefoot can help an individual learn to do.

Runners often agree that going barefoot not only connects you to the world, but also frees you from yourself. Tallis, a barefoot runner describes the experience as "the most liberating

feeling in the world." He goes on to say that "while we still remain attached to our human form, barefoot running is the closest feeling to that most natural of all movements. A sense of total freedom, effortlessly gliding with and like the wind" (Tallis, 2012). Freeing your feet from your shoes allows you to free yourself from the constraints of the modern world and everyday life. Many barefoot runners agree that when they go barefoot they feel like they can forget all of their worries and stress and immerse themselves in the thrill and joy of their run.

Many people think it is beneficial to take a step into the past to escape the technology and crowded, work-filled world of today and feel true freedom. Taking off their shoes allows many of these people to connect with the past. Ever since industrialism took hold in the West, a large percent of the population has believed that our early ancestors lived simpler lives that allowed them to be happier and healthier than the population today. People with this mindset often look to the barefoot tribes of the world for guidance. It is a wonder how tribes like the Tarahumara can run for mile after mile without any of the protein gels and sports drinks that many modern marathoners rely so heavily on. Christopher McDougall points out in *Born to Run* that the tribe does not seem to train any special way before their runs or require any special equipment "they just stroll to the starting line, laughing and bantering…then go like hell for the next forty-eight straight hours" (McDougall, 2009, p. 16). "Laughing and bantering" are usually some of the last things you will ever see modern runners do as they wait at the start line or set out on their daily run, but barefoot runners argue that this is exactly what should occur. If the Tarahumara can go without all of the amenities of the modern world and be excited for extreme distance runs, then why shouldn't all runners? Barefoot runners believe that our "advances" in running gear are what hold us back from the stress-free and impressive running performances of the Tarahumara and other barefoot tribes.

"In the beginning, we were barefoot. Then we screwed up and invented running shoes."

-Barefoot Ken Bob Saxton, *Barefoot Running Step by Step*

Barefoot Ken Bob Saxton has been featured in *Runner's World*, *Born to Run*, and *The New York Times* and is often considered a leader in the barefoot running world. To an extent, Barefoot Ken Bob Saxton is completely correct in his statement about the invention of running shoes because until the 1960's running shoes were unheard of (Holsomback & Peak, 2012). Despite the many changes and advances in the number and styles of modern running shoes, an increasing number of runners are choosing to wear minimal footwear or to simply go barefoot. Barefoot running clubs have cropped up everywhere and barefoot blogs have overtaken the internet. This phenomenon is intriguing to avid-runners and non-runners alike. It has also grasped the interest of researchers and inspired numerous studies over the last ten to twenty years. These studies focus on a large variety of factors in barefoot running, such a gait analysis, force production and absorption, and running economy.

Foot strike is a likely cause of the many injuries that runners are trying to escape and avoid. So logically, the majority of the research performed on barefoot running focuses on foot strike patterns. Generally, researchers refer to three types of foot strike; forefoot, midfoot, and rearfoot. More than seventy-five percent of runners today are rearfoot, or heel strikers (Perl, Daoud, & Lieberman, 2012). The padded heel of the common running shoe encourages a rearfoot strike because it elevates the heel and reduces the pain felt during a heel strike in comparison to barefoot (Morgan, 2013). It is believed that heel striking increases injury risk for multiple reasons. One of the proposed reasons for this is that heel striking creates higher impact forces during contact with the ground and those forces travel through the body faster than with a midfoot or forefoot strike (Warr, Fellin, & Seay, 2013). The increased speed of the forces is due

to a more direct path through the body because heel striking allows the forces to travel through one foot bone, the calcaneus, and into the leg. There are twenty-six bones and a multitude of muscles and tendons that comprise the foot (Sandler, 2010) and in a midfoot or forefoot strike the force must travel through most of these before reaching the leg (Williams, Green, & Wurzinger, 2012). A rearfoot strike removes most of those bones, muscles, and tendons from the equation and does not allow the arch of the foot to help absorb a portion of the landing forces as a mid or forefoot strike does (Yessis, 2000).

Unfortunately, the research about foot strikes does not provide a definitive answer as to whether a rearfoot strike is more harmful than a forefoot strike. A study by Williams and colleagues (2012) found that during a forefoot strike less force is absorbed by the hip and the knee than in a rearfoot strike, but more force is absorbed by the ankle. Basically, forefoot striking decreases the work at the knee and the hip and increases the work at the ankle. This places a higher demand on the Achilles, which is placed in a lengthened position; this could increase the possibility of rupture (Morgan, 2013). It is also important to take into consideration the fact that when looking at the total amount of force absorbed by the lower extremities, the forefoot strike absorbed less force (Williams et al., 2012). Another study observed that a forefoot strike decreased ankle dorsiflexion, which increased the power absorption and generation at the ankle (Bonacci et al. 2013). The increase in power at the ankle also meant a decrease in power at the knee. In a forefoot strike, the knee is less extended at contact, which also decreases the amount of stress placed on the joint during running. This finding is supported by a study performed by Dr. Daniel Lieberman, who found that barefoot runners who have a forefoot strike create less collision force than those with a rearfoot strike. Dr. Leiberman believes this is largely due to the fact that there is more plantar flexion at the time of impact

when using a forefoot strike (Nearman, 2011).

One particular study suggests that due to the decreased work that is performed at the knee and hip during a forefoot strike, barefoot running may be therapeutic for individuals with injuries in those areas (Bonacci et al., 2013). Therefore, it seems logical that the reverse may also be true; individuals with ankle injuries may find it therapeutic to run in a shoe that encourages them to rearfoot strike. In fact, Dr. Steven Subotnick (1977) suggests that the ideal shoe has a thick sole with two to three layers of rubber. He claims that the higher heel reduces the stress on the Achilles tendon. Dr. Subotnick does admit that, although the heel will reduce stress, it will also reduce the amount of force the Achilles tendon can produce during push off. According to the 2012 study mentioned earlier, running shoes can decrease the peak ground reaction force during impact by twenty-two percent when comparing the same foot strike in a shoe and barefoot (Williams et al., 2012).

The modern running shoe may be to blame for the commonality of the heel strike, not just because of the safety that the cushioning provides, but from the way it elevates the heel. A study of the biomechanics of running compared the joint angles and leg and foot positioning between barefoot and shod running. In analysis of those that naturally ran with a forefoot strike showed that for most of the participants the leg and foot positioning were the same when shod and barefoot (Lieberman, Venkadesan, Daoud, & Werbel, 2009). Regardless of the natural forefoot strike and same foot and leg positioning, the runners ran with a heel strike when shod. This occurred because the wedge of the shoe heel caused their heel to contact the ground first.

For those suffering from hip or knee pain that might benefit from switching to a forefoot strike the question arises if running barefoot will help them make this foot strike change. One study that observed individuals running shod and barefoot found that only sixty percent of the

runners involved in the research adopted a midfoot or forefoot strike when they were barefoot (Williams et al., 2012). This suggests that going barefoot will likely not cause an immediate change in foot strike, but many barefoot runners appear to believe that it will heavily encourage a change and with some training a forefoot or midfoot strike can be adopted.

Injury prevention and recovery are certainly not the only reasons for runners to leave their shoes in the dust. Many barefoot runners agree that the opportunity for the feet to really feel the ground and provide the body with feedback about the running surface is an important aspect of barefoot running. Barefoot Ken Bob Saxton cleverly labels this process "feetback" (Saxton & Wallack, 2011). Without shoes the feet are able to feel the surface on which you are running and use information such as how hard or flat the surface is to tell the body how to adjust its running form. Wearing shoes puts a wall between your feet and the ground which interrupts the instantaneous feedback responses that are natural to the body.

Mechanoreceptors are the mechanisms behind the amazing feedback system of the feet, which contain approximately two-hundred receptors per square centimeter of skin (Yessis, 2000). These mechanoreceptors and the many nerve endings found in the feet allow our bodies to make slight changes during movement for protection. Shoes inhibit the functioning of the feedback response because mechanoreceptors and nerves cannot properly detect the type of surface you are running on. Because of this, those who run in shoes often hit the ground two to three times harder than those who run barefoot (Sandler, 2010). According to podiatrists, shod runners likely strike with such a great force because shoes prevent us from properly feeling how hard our feet are hitting the ground and from feeling the surface we are running on so that the body can make the proper adjustments (Saxton & Wallack, 2011).

A study discussed in *The Runner's World Complete Guide to Minimalism and Barefoot*

Running opens our eyes to an entirely different explanation for a less forceful foot strike when barefoot. The study had a group of participants jump off of a bench and onto a variety of mats, each a different color. They were told that the colors indicated how hard or soft the mat was, but in reality each mat was the same. When participants thought they were jumping onto a hard surface they landed with less force than when they thought the surface was soft (Douglas, 2013). This suggests that our expectations play a big role in how our bodies prepare for the activities we are going to do. This may explain why many individuals run with a softer landing when they are barefoot. When wearing shoes we know that the shoes will be there to absorb some of the force and protect our feet so we feel more comfortable or safe running with a heavier footfall. When we run barefoot we know that there is nothing to protect our feet from the impact so we run with softer footfalls, similar to the participants who thought they were going to land on a hard surface.

Barefoot Ken Bob Saxton explains that "feetback" is the cause for two of the major benefits of barefoot running. We have already discussed the first benefit, decreasing force at impact, but the second is a less easily noticed benefit, improved balance (Saxton & Wallack, 2011). Just the mere ability to feel the ground improves our balance (Sandler, 2010). Think about when you are really cold and your feet begin to go numb, you can't feel the surface you are walking on very well and often stumble and feel off balance. Shoes may have a similar effect on the body making it harder to feel the surface and thus, keep our balance.

The mechanoreceptors in our feet are not the only anatomical aspect involved in helping improve our balance, but so are the bones, muscles, and tendons of our feet. All of the metatarsal bones can move separately from each other, which can allow them to play a major role in our balance (Sandler, 2010). The toe box of the traditional running shoe is often too constricting and interrupts the natural metatarsal movement in the foot (Douglas, 2013).

Releasing our feet from the, in the words of many barefoot runners, "cages" that we so often trap them in may allow our feet to gain back their intrinsic abilities.

A less likely reason for the recreational runner to lose the shoes is an improved running economy. Although this is not a big concern for casual runners, for those that run competitively running economy is an important factor in performance. Running economy is simply defined as the amount of energy you need to run at a set intensity. Running economy is determined by oxygen consumption and utilization during running. Studies have shown that training can improve an individual's running economy (Douglas, 2013). Because running economy has such a big influence on running performance during distance events, it is important for competitive runners to improve their economy.

Dr. Daniel Lieberman performed a study comparing the running economy in shod runners and barefoot runners and found that running barefoot usually resulted in a better running economy. Specifically, the study revealed that every one hundred grams of weight added to the bare foot when running at a seven minute per mile pace resulted in 1.2% decrease in running economy (Douglas, 2013). Therefore, despite any running mechanics or foot strike preferences, simply removing the weight of shoes from your feet can improve running economy because there is less weight to accelerate at the end of the leg during each stride (Lieberman et al., 2009). This explains why most distance running shoes are very light weight and many distance runners look for the lightest shoes they can find. Maybe shedding their shoes completely would be more beneficial for the competitive runners.

Some of the research done in Dr. Daniel Lieberman's lab at Harvard University focuses on energy expenditure. The research has shown that barefoot running often results in an energy expenditure that is five percent lower than during shod running. These results may occur

because many runners used a forefoot strike when running barefoot. The foot and the calf muscles work as natural springs during running and a forefoot strike allows for better storage and release of energy during toe off (Lieberman et al., 2009). The tendons, ligaments, and muscles of the foot and lower leg store energy during the first half of a stride and then release that energy in the second half to push the body up and forward (Perl et al., 2012). Another study from Dr. Lieberman found that forefoot and rearfoot strikers were approximately 2.3% more economical when they ran in a minimalist shoe compared to the typical running shoe (Douglas, 2013). This highlights that foot strike and decreasing the amount of weight on the feet work together to improve running economy. It is important, however, to keep in mind that minimalist shoes are not the same as going barefoot. Barefoot usually results in less ankle dorsiflexion, a shorter stride, and increased cadence compared to a minimalist shoe, all of which can effect running economy (Bonacci et al., 2013).

Dr. Lieberman was not the only person to realize the importance of running economy, The Ohio State University doctoral student, Nick Hanson, also decided to study the difference in running economy between shod and unshod runners in 2009. This study looked at a wide variety of factors that affect running economy and ultimately found that barefoot runners had 2% lower heart rates and consumed 5.7% less oxygen at a specific intensity. Together these two factors show that running barefoot is considered more efficient from an oxygen consumption and energy standpoint (Saxton & Wallack, 2011).

As discussed, the muscles of the foot play a role in improving running economy and can affect performance in many other ways. Foot strength and mechanics are two characteristics that can be greatly affected by whether training is done shod or unshod. Many avid barefoot runners believe that shoes may prevent our feet from developing and functioning properly. Shoes

provide too much arch and ankle support and weaken the muscles in the foot and ankle that were designed to provide that support naturally. Studies of habitually barefoot nations and tribes have found that individuals from these areas often have stronger and more mobile feet. Shoes and orthotics may be perfectly designed to help correct certain gait or foot strike problems and injuries, but if there is not a problem to be fixed they may actually become the cause of a problem (Yessis, 2000); after all, if it isn't broken don't fix it.

Barefoot running also often results in a change in foot and tendon position. Due to the raised heel of a running shoe the Achilles tendon is normally in a more shortened position than when an individual is barefoot. The lack of a raised heel and the possibility of transitioning to a forefoot strike put the foot into more plantar flexion when running, which lengthens the Achilles tendon and places more stress on it (Bonacci et al., 2013). The change in foot position can have many affects, some of which may actually increase the risk of injury without proper training. Increased plantar flexion can increase the risk of tendonitis in the Achilles tendon and forces the triceps surae to be more active during running, which often leads to soreness and sometimes overuse injuries (Bonacci et al., 2013).

The toe flexor muscles and the metatarsal-phalangeal joints are the link between the large muscles in the leg and the ground. One study found that training barefoot or in minimalist shoes causes the toe flexor muscles to hypertrophy, or grow in strength. In theory, this should make the foot better at transferring the force produced by the large leg muscles into the ground during toe off to help produce upward and forward movement. But despite the increased strength in the toe flexor muscles, the study did not show an improvement in running performance after a strength training regimen for these muscles. There was, however, an improvement in horizontal jumping. The researchers believed this occurred because jumping shifts the body's center of

mass forward over the toes, which allows the muscles in the toes to more effectively push that mass forward (Goldman, Sanno, Willwacher, Heinrich, & Bruggemann, 2013). In Michael Sandler's book, he discusses exercises to help runners feel comfortable shifting their weight forward while running. Learning to run with the body angled forward at the ankles causes the majority of the body weight to shift in the direction you want to go and allows gravity to perform some of the work needed to move the body forward (Sandler, 2010). This sort of adjustment when running barefoot may allow the toe flexor muscles to use their increased strength more effectively to push the body forward and improve running performance.

"Every morning in Africa, a gazelle wakes up. It knows it must outrun the fastest lion or it will be killed. Every morning in Africa, a lion wakes up. It knows it must run faster than the slowest gazelle, or it will starve. It doesn't matter if you're a lion or a gazelle—when the sun comes up, you'd better be running" –Anonymous, *Born to Run*

After evaluating just a fraction of the large amounts of research the question of the safety and efficiency of barefoot running still remains unanswered. Unfortunately, the science does not provide any definitive answers. Steve Magness, an elite running coach, points out that there are many holes in the masses of research about barefoot running. He highlights that there are very few long term studies about barefoot running. Most studies are performed using habitually shod runners or habitually barefoot runners, and very few follow individuals switching to barefoot over a long period of time in order to observe the long term changes and adaptations that occur (Douglas, 2013). Even if the research were more complete, this is likely a question that cannot be answered for runners as a whole but is something each runner must explore for him/herself. Most experienced barefoot runners suggest that all people should give going barefoot a chance. I decided to take the advice of those barefoot runners and begin my adventure into barefoot

running.

Although my research could not provide me with an answer as to whether barefoot running would be safer or more beneficial for me than shod running, I was able to use what I learned to make my transition as safe as possible. Taking the advice of many experienced barefoot runners who warn against going too fast too soon I took my transition into barefoot running very slow. Barefoot Ken Bob informs his readers that the key to barefoot running is to "take it slow, learn the basics, and build gradually" (Saxton & Wallack, 2011, p. 14). After learning the hard way Jason Robillard quickly found out that Barefoot Ken Bob's advice was very important. He took training too quickly and found himself set back three months as he waited for his overuse injuries to heal properly (Sandler, 2010). I decided to take things slowly and began by shedding my shoes for only the last one-hundred meters of my run for the first couple of weeks and tried to increase my distance very slowly.

Despite the warnings about going too quickly my competitive nature took over a few times and I found that I went too far before my body was ready for those distances. When I did this it left my feet and legs more sore than usual and often resulted in a few new blisters on my feet. I quickly learned that taking it slow was much more important than improving my distance or time and that it was okay to be content with making small advances at a time.

In my years of running shod I noticed that I favored a heel strike. I worried that if I continued to heel strike when I started running barefoot it could not only cause me heel and foot pain due to the lack of cushioning to protect my feet from the impact, but also might put an increased amount of stress on my joints. This knowledge influenced my running form when I shed my shoes. When running barefoot I heavily focused on using a more forefoot strike to avoid any injuries that may accompany heel striking without the protection of shoes. I did this

by adopting a more shortened stride. When shod I have a very long stride that places my foot far in front of my body, forcing me to land on my heel. When I run barefoot this stride length causes heel pain at impact so to avoid hitting so far back on my heel I learned to run with a shorter stride that places my foot more underneath my body at landing.

Despite my concentration, avoiding a heel strike was not an easy task. I was never able to accomplish a true forefoot strike, but I did begin to adopt a foot strike pattern similar to one described by Dr. Steve Subotnick (1977) in his book *The Running Foot Doctor*. He describes a foot strike in which impact with the ground occurs near the arch and is followed by rocking the foot back to the heel before beginning the push off phase of the gait cycle. This new foot strike pattern was useful in preventing the "pounding" of my feet against the ground that normally occurs when I heel strike.

One of the first changes that I noticed when beginning to train barefoot was that I was much more conscious and careful of my footfalls. I was sure to have as soft of a landing as possible, because on the hard asphalt surface a remotely heavy footfall was painful. I also noticed the differences in my footfalls when I would run on asphalt versus grass. On a soft, grassy surface my footfalls were less calculated and often heavier than on the asphalt. This occurrence made me think of the study featured in *The Runner's World Complete Guide to Minimalism and Barefoot Running* that used mats of different colors to observe how individuals react to surfaces they believe to have different thicknesses (Douglas, 2013). I caught myself changing my footfall in the transition from grass to asphalt and vice versa even before my foot hit the ground to provide my body with "feetback" about the surface. I also noticed that my body would quickly adjust to any terrain changes that my feet were experiencing. I found that my body adjusted its form to hills, through a shortened stride and higher knees, more quickly

when I was barefoot. My body seemed more sensitive to the terrain I was running on and that made it easier to adjust to any surface changes.

Despite the changes in my footfalls, I still experienced soreness in my feet due to the running surfaces and stressing muscles that were not usually stressed when I ran shod. I quickly realized that it would be helpful to do more than run barefoot, so I hit the books to find barefoot workouts. I found exercises that would help strengthen my feet, ankles, and other muscles that are stressed during barefoot activity. Many of the exercises involved balancing on a single foot and I quickly learned that I did not have good balance, but that it was slightly better when I was barefoot. I could feel the muscles flex in my feet in an effort to help my body stay balanced. As my feet became stronger from more barefoot activity my balance started to improve. When first reading the research about improved balance when barefoot occurring due to better ability of the metatarsals and foot muscles to function I was skeptical, but when I shed my shoes I could feel the separate muscles flex when they were needed. I could tell that my metatarsals were able to move separately and, with the help of tendons and muscles, they would do so in order to support my swaying weight as I tried to balance myself.

Even after my first barefoot experience, which only lasted one-hundred meters, it was clear that my feet were not the only thing that would be greatly affected when I took off my shoes. One of the first things I noticed after my first barefoot endeavor was soreness in my calf muscles. Although I did not realize that I was in more plantar flexion, my calves certainly informed me they were under more stress by becoming very sore. As I continued to barefoot run I began to notice that my calves felt more powerful during push off and even started to look more toned. I was not surprised when many of the barefoot workouts that I found included at least one component to help strengthen the calves and Achilles.

"All she's doing is…running. Running, and smiling."- Christopher McDougall, *Born to Run*

Unlike many others who try barefoot running, I did not do so to rediscover a love of running. I am one of the lucky few who have never lost their love of running. Although barefoot running did not lead me to find a renewed love of running, the love and enjoyment I experience from barefoot running is different than what I feel when I am running shod. The love I have for running shod is for the thrill of the run, the powerful feeling in my legs, and the idea that I control how far and where I go. The love I have gained for barefoot running is for the freeing feeling of the ground beneath my feet and the excitement of a new challenge. Barefoot running gives me a way to mix up my workouts and provides me with new goals to work towards. After running for so many years I did not believe that I would ever again feel accomplished after running a mere one mile, but when I completed my first barefoot mile I felt like I had accomplished something great. Finishing my first full mile barefoot reminded me of how I felt after finishing my first 5k race.

After my first full barefoot mile, I realized that running barefoot had changed my view on running. When running barefoot I no longer had "bad" days, every day that I was able to take a few steps without my shoes was a good day. Before I started barefoot running I used to think that if I did not feel strong when running or could not run as far or as fast as I would have liked then I had not had a good run. Now each day that I get out there and just let myself enjoy my run is a good day regardless of whether I performed the way I had hoped.

One of my biggest fears when I started running barefoot was that without the sound of my feet against the ground it would not provide the same escape from the world that shod running had. I thought that I had become so dependent on this sound that without it I would lose

a little bit of my love for running. I was right that barefoot running would not provide the same escape as running shod but instead I found a new escape. Although the sound of my footsteps became too quiet to lose myself in, the feeling of my bare feet against the ground provided me with a new escape. Without the sound of my shoes I began to tune into the sounds that were occurring around me. I began to, as Michael Sandler (2010) describes it, "run aware." I was paying more attention to the sounds around me than the sounds I was creating. It became very easy to get lost in the sound of the wind in the trees or the birds chirping. Nature went from something that I would appreciate on my runs to something that I would immerse myself in and fully experience. I was no longer just looking at the world around me; I was listening to it, feeling it, and getting lost in it.

My new awareness of nature allowed me to gain a new kind of connection with the world around me. Running has always allowed me to connect with nature, but going barefoot gave me a way to expand that connection. When I run shod I feel a connection to the world as a whole. I am not focused on what I can see and feel, and instead get lost in the awe-inspiring vastness of the world. I get lost in appreciating not only what I can see but also in thinking about what an amazing and beautiful world we have. When I run barefoot I become so absorbed in the little piece of the world that I am in that I don't think about the rest of the world. I think the difference occurs because I become so focused on the way that the earth feels on my feet that there is no room for me to think about the rest of the world. When I am barefoot I *think* less and *experience* more.

A problem many barefoot runners have with modern runners is that they avoid nature with all of the new gadgets. They believe that we need to be more like our ancestors and reconnect with the beauty of nature. I have definitely been guilty of disconnecting myself from

the world using technology. When a run starts to get tough I am usually quick to turn on my iPod and distract myself from the discomfort. When I started barefoot running I decided to leave my iPod at home to allow me to fully focus on my run and protect myself from injury. I quickly realized that even if I had taken my iPod along I would not have needed it because there was always something more interesting to focus on. In fact, I sort of embraced the discomfort I felt because it was my body's way of telling me that I was doing something wrong. When I did not experience any discomfort I found myself so wrapped up in the sensations of my feet that I did not need any other distraction. I have discovered that since beginning my adventure into barefoot running I no longer use my iPod when I am running at all, shoes or no shoes. Any time I begin to grow tired during a run I no longer need to find a distraction because I am able to immerse myself in the way my body feels and the world around me.

Becoming immersed in the world was not something that came easily when I started going barefoot. At first I was too focused on my form and my feet to truly even enjoy the run. It took a few runs before I allowed myself to relax enough to even catch a glimpse of the freedom that many barefoot runners feel each time they run. A barefoot runner described his experience as, "a sense of total freedom, effortlessly gliding with and like the wind." This was not my initial experience with going barefoot, because it was anything but effortless. My first few runs were more uncomfortable than they were freeing. I was constantly worried about my form and how hard my feet were hitting the ground. I did not completely realize or embrace the freedom of going barefoot until I completed my first full mile without shoes.

After I relaxed into running barefoot and was able to become immersed in the run and the world around me, I began to really discover the joy of barefoot running. Christopher McDougall's description of the Tarahumara as childlike is the same description I would use for

the excitement I now have when barefoot running. When I took off my shoes it suddenly became fun to run on all different types of surfaces. I caught myself running through grassy patches and mud puddles just like a playing child would. Like a child walking through a store has the desire to touch everything on the shelves, I suddenly had the desire to have my feet touch every running surface in sight. Running shod was always an escape from stress, but barefoot running became a game. I looked forward to my run the way a child looks forward to recess; I just wanted the chance to play.

"If you do decide to try barefoot running do so gradually and carefully. It is crucial to build up foot strength, calf strength, and learn good form. But most importantly, be a skeptic. Do what you want, have fun, avoid injury, don't fix what ain't broke." –Dr. Daniel Lieberman, "The Science of Barefoot Running"

Dr. Lieberman makes a good point when he warns runners to be skeptical. It is important to be skeptical about barefoot running as well as shod running. Convincing yourself that one way is better than the other without doing the proper research may prevent you from discovering which running style is most efficient and comfortable for you. Unfortunately, research cannot provide definitive answers about whether or not barefoot running is the right choice for everybody. The only way to find out if going barefoot is safe and useful for you is to give going barefoot a test run and use the research and experiences of others as a guide to make sure the test run is as safe as possible.

As discussed earlier, foot strike is a very important factor in whether or not barefoot running will be safe. A heel strike is considered a potentially harmful foot strike pattern when an individual is running shod and the chances of injury due to this pattern increase when an individual is running barefoot. A heel strike during barefoot running can cause excessive

amounts of force to travel through, and possibly damage, joints (Warr et al., 2013). This does not mean those with a heel strike cannot barefoot run, in fact, this may be a reason to give barefoot running a try. Many believe that barefoot running can promote a forefoot strike, and thus help reduce the stress running puts on the body. However, if a heel striker cannot convert to a midfoot or forefoot strike while barefoot running it may be safer to wear a shoe to help absorb some of the impact. It is important to keep in mind that foot strike changes are not always immediate changes that occur when going barefoot. It may take more time before the body becomes accustomed to running barefoot and can make all of the changes vital to become a safe barefoot runner (Morgan, 2013). So, although it is dangerous to continue running barefoot incorrectly for too long, it is also important to give your body the opportunity to make its adjustments.

The most common piece of advice found in research and from the experience of others is to make the transition into barefoot running slowly. Michael Sandler (2010) explains that it is important to progress into barefoot running slowly and also be willing to take breaks. Converting to barefoot running can be hard on the body because it forces muscles that were not previously utilized to become the workhorses. Going slowly and taking breaks when experiencing pain can greatly reduce the risk of injury when switching to barefoot running. Barefoot Ken Bob coins the term "Barefoot Running Exuberance Syndrome" to describe those who get too excited about running barefoot and forget to slow down and listen to their body. He explains that it is important to listen to your body because it will tell you when it needs a break (Saxton & Wallack, 2011). For many this is hard to do because we are constantly told the "no pain, no gain" theory, but in fact, pain may be one of the first indications that we are pushing too

far and are risking an injury which may set us back. Barefoot Ken Bob Saxton runs with the belief that "if it hurts I must be doing something wrong" (Saxton & Wallack, 2011, p. 129).

Many suggest that the best way to take things slow is to begin by taking your shoes off more throughout the day so your feet become accustomed to being free. According to the American Chiropractic Association, those who are beginning the transition to barefoot running should begin with barefoot walking (Morgan, 2013). Once the feet become accustomed to walking barefoot it is safe to begin doing small portions of your runs without shoes. Barefoot Ken Bob Saxton suggests that people try to wear their shoes less throughout the day so that they can help strengthen the muscles of the feet without placing them under the amount of stress that running does (Saxton & Wallack, 2011). Cleaning the house or doing yard work barefoot are ways to incorporate your barefoot training into your everyday life and prepare your feet for the real activity of barefoot running.

Michael Sandler (2010) explains that taking it slow not only refers to your progression into barefoot running, but also the speed that you run. He and many other barefoot runners warn beginners to expect to slow down when they first start taking off their shoes. The body naturally slows down because the feet are adjusting to feeling the running surface. The body must make changes to allow you to run barefoot comfortably and safely. While the body is making its changes, most individual's making the transition will run much slower than they did when they ran in shoes. The slower pace is due to a multitude of factors including changing foot strike and stride length. For most runners the decreased pace is an initial aspect of barefoot running that is hard to accept. Although it is hard to accept going slower, many barefoot runners have found that the joy of the run overshadows the fact that they have slowed down. One runner states, "I don't care anymore if someone overtakes me. I just let them go… I don't care if I'll ever be able

to run as fast or as far again. Maybe I will, maybe I won't. None of it matters. The only thing I care about is the next footstep" (Tallis, 2012). For those whose competitive nature fuels their love for running it is important to remember is that the body must make many changes when adjusting to barefoot running.

One of the reasons runners slow down when they take off their shoes is that their stride length decreases. Usually this is a natural reaction to running barefoot, but some runners are able to maintain a long stride. Keeping the long stride may seem like a good thing because it helps these individuals initially run faster than others, but over striding can be dangerous. It can cause a heel strike or too much pointing of the toe, both of which increase the risk for injury (Lieberman et al., 2009). When starting to barefoot run it is important to adopt a shorter stride. Although there is an initial decrease in pace due to a shorter stride, training can help the body learn to run with a quicker cadence that can allow you to increase your speed and possibly become faster than when you trained and ran shod.

Even if a runner follows all of the advice and progresses into barefoot running slowly, almost every runner will experience some mild side effects of making the change. In order to run on many of the hard surfaces of the modern world, the soles of the feet must be tough. A lot of beginners want to know what they can do to help toughen the skin of their feet. But, unfortunately, there is not a more effective way to toughen the feet than simply going barefoot (Sandler, 2010). Taking the advice discussed earlier and going barefoot more often throughout the day can help the soles of your feet adjust to the many surfaces that you will encounter slowly and allow the skin to become more resilient. Because the soles of our feet are not accustomed to coming in contact with many surfaces besides the soft, plushy carpeting of our homes, it is common for the skin to experience some changes. Peeling skin, blisters, and callouses are

common side effects of going barefoot (Nearman, 2011). For most individuals, going slow will allow the feet to make their adjustments properly and eventually side effects like these will become rare or even obsolete.

Another issue that many people face when making the change to barefoot running is dealing with the weather. The question always arises if should we run barefoot when it is cold or not. Researchers and barefoot enthusiasts have mixed feelings on this subject. The American Chiropractic Association warns against running barefoot when the temperature drops too low. Shoes provide protection from the threat of frostbite during the winter and it may be safer to put on shoes when running in such conditions (Warr et al., 2013). However, Michael Sandler (2010) and many other barefoot runners run barefoot outside all year round. Rain or shine, on sun warmed trails or snow covered paths, many dedicated barefoot runners refuse to stop or put on shoes. Of course the decision to run barefoot in adverse weather is up to each individual runner, but it is important to keep in mind that injury, including frostbite, can greatly set back training. The risks of running in the cold must be weighed properly against the benefits.

From the research and experience of barefoot runners it is clear to see that the transition from shoes to barefoot is not easy, nor will it work for everyone. The main thing to remember when making the transition is that if your body does not make the proper changes that allow you to run barefoot safely it would be wise to put the shoes back on. Dr. Lieberman states the most important lesson to be learned from barefoot running; "The lesson of barefoot running is not about whether you run with or without shoes. What's more important is your running form" (Nearman, 2011, p. 5). I think that it is prudent to add to Dr. Lieberman's statement. Barefoot running, and running in general, is not only about your running form or how efficient you are, but it is also about how you feel. If barefoot running is less enjoyable than running shod

then maybe it is not the right option for you. Although running is a great form of physical activity and is associated with many health benefits, it is also a largely mental activity. Your mental state and enjoyment greatly effect performance and if running barefoot does not benefit you mentally it likely will not benefit you physically either.

Whether you have a previously established love for running or are hoping to discover a love for running it may be time to try something new. You may be surprised to find that the small act of taking off your shoes can make all of the difference. Do not get lost in the monotony of the day to day working grind that so many people cannot seem to escape. Everyone needs a little adventure to keep life interesting and barefoot running could be the perfect way to escape. Without giving it a try you will never know if barefoot running can improve your running form and decrease the occurrence of injury. Most importantly, without taking a chance with barefoot running you will never discover if it is the key to finding the most exhilarating and enjoyable run of your life. Barefoot runner and blogger, Tallis, is quoted, "something about barefoot running brings me into the running like nothing else. And being at one with running, I become one with myself, which in turn brings me into a state of oneness with everything. This, for me, is the joy of barefoot running" (Tallis, 2012).

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